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ABSTRACT

This pair of papers share the focus of determining how differential exposure to information influences attitude formation and change. The first paper deals with the question of how differing amounts of information (set size) affect attitude formation. Set size effects in impression formation have not been obtained when examined in between-subjects design formats. This methodological difference has theoretical implications for interpreting the set size effect. Employing six set sizes, the between-subjects effect was obtained as predicted by both reference scale and information integration interpretations. A second experiment requiring judgement of 28 stimulus persons tested contrary predictions of the two explanations regarding the differences between earlier and later trials in the series. Supporting the reference scale interpretation, between-subjects set size effects diminished over trials. The second study looks at repetition effects. Repetition was predicted to increase positive reactions when highly similar messages were used. Advertisements were used as the stimulus message. Five similar ads were sequentially presented and attitude was measured by a cognitive response analysis of the thoughts recorded by subjects while attending to the message. In support of the hypothesis, a positive relationship was found between number of presentations and attitude. (Author/SJ)

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INFORMATION AND ATTITUDES: THE EFFECTS OF REPETITION AND AMOUNT OF INFORMATION

by

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PREFACE

This research was partially supported by NSF GN 534.1 from the Office of Science Information Service, National Science Foundation to the Computer and Information Science Research Center of The Ohio State University. The Computer and Information Science Research Center of The Ohio State University is an interdisciplinary research organization which consists of the staff, graduate students and faculty of many university departments and laboratories. The research was administered and monitored by the Ohio State University Research Foundation as project RF 2218. Additional support was provided for the second study described (Message repetition and attitude change) by an Ohio State University Dissertation Fellowship. The authors wish to thank Cynthia Allogia, Betty Wilson, Katherine Schultz, Frances Kletz, and Joyce Decker for their help on the first study and A. Greenwald, D. Gregorski, M. Hakel, and H. Pepinsky for their assistance on the second study.

Thomas M. Ostrom is an associate professor in the Department of Psychology at Ohio State University. He has been affiliated with the Computer and Information Science Research Center since 1969. L. R. Sloan is a graduate student in the Department of Psychology and is working on the project dealing with information and attitudes. J. L. McCullough received his Ph.D. in Psychology in 1971 and is now affiliated with the Applied Behavioral Sciences Center of E. N. Hay and Associates.

FOREWARD

This pair of papers share the focus of determining how differential exposure to information influences attitude formation and change. The first paper deals with the question of how differing amounts of information (set size) affect attitude formation. Set size effects in impression formation have not been obtained when examined in between-subjects design formats. This methodological difference has theoretical implications for interpreting the set size effect. Employing six set sizes, 1 to 32, the between-subjects effect was obtained as predicted by both reference scale and information integration interpretations. A second experiment requiring judgment of 28 stimulus persons tested contrary predictions of the two explanations regarding the differences between earlier and later trials in the series. Supporting the reference scale interpretation, between-subjects set size effects diminished over trials.

The second study looks at repetition effects. Past research has not found any immediate effects of message repetition on attitude when identical messages are repeated verbatum. In the present study repetition was predicted to increase positive reactions when highly similar messages were used. Advertisements were used as the stimulus messages. Similar advertisements were defined as those which, while using the same basic arguments to promote a given product, differed in the phrasing and order of points raised. Five similar ads were sequentially presented and attitude was measured by a cognitive response analysis of the thoughts recorded by subjects while attending to the message. In support of the hypothesis, a positive relationship was found between number of presentations and attitude. This effect was replicated across two separate attitude topics.

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AMOUNT OF INFORMATION AND INTERPERSONAL JUDGMENT

Lloyd R. Sloan and Thomas M. Ostrom

The Ohio State University

Trait adjectives of known affective value have long been used in various combinations and sequences in investigating the process of impression formation. An effect that has been repeatedly found with these stimuli is that impression judgments become more extreme as the amount of isovalent information describing the person increases, even when the mean affective value of the information set is held constant. For example, the pair of positive traits, ORDERLY and PROUD, has the same average likeableness value as the larger set, DIGNIFIED, OBJECTIVE, ORDERLY, PROUD, CONSISTENT and PAINSTAKING, but a person described by the set of six traits will be rated as being more likeable than one described by the set of two traits.

An examination of past research on this set size effect (see Table 1) shows an overwhelming confirmation of its reliability. Only six of these 29 independent studies did not obtain the set size effect. These exceptions, however, do not appear to be merely chance deviations from the general rule. In five cases, subjects had been presented with trait sets of only one size prior to making their judgments. Sets of larger or smaller size than the one they judged were either not shown or were presented in a later part of the experiment. This observation suggests that the difference in the evocation of a set size effect may result

Name	Set Size	Set Sizes Presented to Each Subject	Set Size Effect
Anderson, L.R. & Fishbein, M. (1965)	0,1,2,3,4	multiple	+[b]
Anderson, N.H. (1965)	2,4	multiple	+
Anderson, N.H. (1967)	1,2,3,4,6	multiple	+
	1,2,3,4,6,9	multiple	+
Anderson, N.H. (1968)	3,6	multiple	+
Anderson, N.H. (1971)	1,2,6	multiple	+
Brewer, M.B. (1968)	1,2,4	multiple	+
Byrne, D. & Nelson, D. (1965)	4,8,16	single	-
Chalmers, D.K. (1971)	2,6	multiple	+
Fishbein, M. & Hunter, R. (1964)	1,2,4,8	multiple	+
Hendrick, C. (1967)	1,2	multiple	+
Kaplan, M.F. (1971a)	1,3,5	multiple	+
Kaplan, M.F. (1971b)	2,3,4,6	multiple	+
Kaplan, M.F. (1971c)	4,8	multiple	+
Kaplan, M.F. (1972)	8,16	multiple	-
Levin, I.P., Schmidt, C.F. & Norman, K.L. (1971)	2,3,4,5	multiple	+
Manis, M., Gleason,	1,2	multiple	+
T.C. & Dawes, R.M.	1,2	multiple	+
(1966)	1,3	multiple	+
Podell, J.E. &	1,3,6	multiple	+
Amster, H. (1966)	1,3,5	multiple	+
	both above	single	-
Posavak, E.J. & Pasko, S.J. (1971)	2,4,8	multiple	+
Rosenblood, L. (1970)	1,2,3,4,6	multiple	+
	1,6	single	-
	2,4,6	single	-
Schmidt, C.F. (1969)	2,4	multiple	+
Schmidt, C.F. & Rosenbaum, M.E. (1965)	3,6,	single	-
Stewart, R.H. (1965)	4,6,8	multiple	+
Willis, R.H. (1960)	2,3,	multiple	+

[a]Table 1 adapted and extended from Rosenblood, 1970.
[b]+ Indicates a significant set size effect, - indicates no significant set size effect.

TABLE 1[a]: Summary of set size experiments in social judgment

from differences inherent in within-subjects and between-subjects experimental designs. The suggestion of such design-linked phenomena has been noted in other paradigms (Grice, 1966). The sixth study (Kaplan, 1972) of this group employed a within subjects design, but did not employ isovalent stimuli. Despite using evaluatively heterogeneous stimuli in a set, the pattern of results did coincide with the set size prediction.

There are two kinds of reasons why this methodological characteristic could effect the set size result, a) known differences in design sensitivity and b) evocation of different psychological processes influencing judgment.

Design sensitivity is greater in the studies that used a within-subject format for several reasons. In the within-subjects design, each subject acts as his own control thereby eliminating between-subjects error. Thus the within-subjects design, because of lower error variance, must be statistically more sensitive.

Another procedure frequently adopted in within-subjects tests of the set size effect, and usually absent in the between-subject tests, is the use of multiple judgments of each size. The use of multiple judgments should serve to enhance statistical sensitivity by providing a more reliable estimate of the subject's response to each level of the independent variable.

If the past inability to obtain a between subjects set size effect was due to differences in design sensitivity, it should be possible to produce a between-subjects effect by maximizing the power of that design. This would entail a) the use of multiple judgments of the given set size to lower the within-cells variance, b) increasing the range of set sizes to raise the between-cells variance and, c) using a large sample size to optimize the

the error degrees of freedom.

It is conceivable, however, that the set size effect can only be obtained with a within-subjects design. If this were true, then any explanation of the set size effect, to be satisfactory, would have to specify why that difference was important. One explanation that could account for this difference is the subject's lack of awareness of other set sizes when he is in the between-subjects condition. In a within-subjects design, the subject is obviously very much aware of the existence of various set sizes. (This argument has been made elsewhere, c.f. Byrne, 1971; Rosenblood, 1970). As a consequence of this awareness in within-subject designs, subjects may explicitly place emphasis on amount of information when making their judgments.

A possible mediating variable between such awareness and evaluative judgments is the confidence or certainty the judge has in his ratings. Confidence has been shown to be greater in judging sets of larger sizes (Chalmers, 1971; Levy, 1965; Posavac and Pasko, 1971). It may be then that in the within design, the subject, aware of various set sizes, increases the polarity of his evaluative ratings to express his confidence (or expected confidence) in judgments of larger sets of traits.

If a between subjects set size effect could not be obtained, interpretations of the effect based on awareness and confidence would become more plausible and explanations that do not incorporate such notions would be seriously weakened. The averaging model of information integration (Anderson, 1971) bases its explanation of the set size effect on the weights and scale values of the initial attitude and the information presented, none of which depend on the subject being aware of multiple set sizes. The averaging model would therefore explain the past inability to produce

a between-subjects set size effect on insufficient design sensitivity. The set size effect should, in principle, be detectable using a between-subjects design.

Another explanation of the set size effect appeals to differences in both design sensitivity and psychological process to account for the between vs within differences. When judging a series of stimuli on an absolute rating scale, it is known that the extreme stimuli anchor the ends of the reference scale (Ostrom and Upshaw, 1968; Parducci, 1965; Upshaw, 1969). In a within-subjects design, where subjects judge a series including both large and small sets, the larger sets will serve to anchor the extremes of the rating scale. Smaller set sizes, being less extreme in stimulus value, would receive less polarized ratings. However, in a between-subjects design, each judge's ideosyncratic perspective or frame of reference would be brought to bear, anchored only by his own past experiences in forming impressions. So, not only should a within-subjects design be more sensitive because each subject acts as his own control, but it should also lead subjects to adopt similar anchors for their reference scale. This reference scale interpretation does predict, however, that the set size effect is obtainable with a sufficiently sensitive between-subjects design. This is because individual differences in prior reference scales should average out given a sufficiently large number of subjects.

Sequence effects

Although the averaging and reference scale formulations both predict a between-subjects set size effect, they have differing predictions regarding the sequential effects of judging multiple sets of a single size. The averaging model would predict that judging multiple sets in a between-subjects

design should enhance the likelihood of finding a set size effect, as the estimate of a person's response is more stable if based on multiple rather than single sets. Further, in absence of extensive practice trials, the later trials should be more stable than the early trials due to increased task familiarity.

In contrast to the averaging model, the reference scale formulation suggests that repetition of sets of a given size in a between subjects design should lead to an attenuation of the set size effect in later trials. This is because the initial ideosyncratic reference scale brought to the task will come to be anchored by the most positive and negative stimuli in the series over repeated judgments, regardless of whether only small or only large set sizes are presented. The most extreme stimuli in either case should receive equally polarized ratings in the later judgments.

It is important to eliminate subject-awareness as the sole explanation for the set size effect if the information integration and reference scale models are to survive unchanged. One logical way to do this is to design a between subjects experiment to be as sensitive as possible. Experiment 1 seeks to provide this greater sensitivity in three ways: (1) a broader range of set sizes are used, (2) more than the usual number of subjects are employed, and (3) each subject gives multiple estimates of set of the same size. By examining the subject's responses over several trials, the reference scale interpretation's prediction of a reduced set size effect over trials may be examined.

Experiment 1

Method

Overall Design. The present experiment provided a between-subjects

test of the set size effect in impression formation. Six levels of set size were studied in which the number of personality traits describing the person to be judged were 1, 2, 4, 8, 16, and 32. Within each condition subjects make impression ratings and confidence judgments of four stimulus persons, two described by favorable traits and two described by unfavorable traits.

Stimuli. In most investigations of set size effects, smaller sized sets are drawn from and completely exhaust the traits composing larger size sets. Thus, subjects judge more smaller sets than larger sets. In the present experiment all subjects judged the same number of descriptions and consequently not all traits present in the larger sets appeared also in smaller sets. A procedure was adopted for trait selection that equated the average affective values of the trait sets and also minimized variance differences.

The stimulus adjectives were selected from Anderson's (1968) trait adjective ratings. On Anderson's 7-point scale of likeableness, the 64 traits used as a basis for the positive sets ranged from 3.45 to 4.11 and the 64 negative traits ranged from 1.98 to 2.54. Within these positive and negative sets, the adjectives were rank ordered by scale value and divided into eight groups of eight trials each. The first group was composed of the eight highest ranked traits, the second group contained the next eight traits, etc.

The largest sized sets, containing 32 traits, were composed of four words drawn randomly without replacement from each of the eight groups. Eight such sets were assembled, four from the positive stimuli and four from the negative stimuli. Eight traits in the original blocks of 64 were

not chosen in the random selection, and were deleted from the 64 before further sets were chosen. Sixteen and eight sized sets were composed by randomly drawing two or one words respectively from each of the eight reduced groups.

Four sized sets were created by randomly choosing two of the eight reduced groups and their complement sets from the opposite side of the mean of the overall group of 56 traits. One trait was randomly selected from the seven items in each of the four groups so chosen. Two sized sets were chosen in the same manner, randomly selecting one of the eight groups and its complement and obtaining one trait from each of the two groups. Subjects in the set size one condition judged both members of the original set size two pair.

To insure greater generality, stimulus replications were included for each set size. For the set sizes 32, 16, and 8, four stimulus sets were drawn from the positive trait group and four sets from the negative trait group. There were 8 four-sized sets and 16 two-sized sets from the positive group of traits, and an equal number from the group of negative traits. As one sized sets were decompositions of the two sized sets, 32 single positive traits and 32 single negative traits were used. The average likeableness rating of the positive sets was 3.77 and the mean values of all descriptions in each set size were, respectively (in ascending order), 3.772, 3.769, 3.771, 3.770, 3.770, and 3.765. The average rating for all negative sets was 2.22 and the mean of each set size, from smallest to largest, was 2.219, 2.218, 2.223, 2.228, 2.225, and 2.223.

Experimental Booklets. Each subject's booklet contained 4 sets of the same size; 2 of the persons were described by moderately negative traits

and 2 by moderately positive traits. The positively and negatively described persons were placed in alternating order in the booklet. As a control variable, half of the booklets began with a positive set and the remainder were prepared in the reverse order, beginning with a negative set.

Since each booklet contained only four stimulus sets, several booklets had to be prepared for each set size to accomodate the differing numbers of stimulus replications. Two non-overlapping booklets were used for set sizes 32, 16, and 8. For set sizes four, two, and one, the number of different booklets was 4, 8, and 16, respectively.

Procedure. Subjects, gathered in groups from three to five were allowed to read directions for the task and the response scales. The subject was told he would be making judgments about a number of different people, each described by a set of equally important adjectives on a single page. The subject was asked to spend 4-5 seconds for each adjective in each set and then make his favorability rating of the person described.

The task was reviewed and any questions answered before the subjects were led to individual cubicles to study and rate the four sets of descriptive trait adjectives in the order presented in their booklet. After approximately 5-10 minutes the experimenter collected the materials and debriefed the subjects as a group.

Response Measures. Following each page of descriptive trait adjectives was a page of response scales. Subjects were required to rate their overall impression of the person described on an 8-category scale ranging from Highly Unfavorable to Highly Favorable. The subject was then requested to generate a new adjective which "well described" the person being rated. This was done in an attempt to further solidify the subjects' opinion of the judged

person. Finally, the subject indicated his confidence in the accuracy of his impression. Confidence was indicated on an 8-category scale ranging from Highly Confident to Highly Unconfident.

For purposes of analysis, the favorability ratings were recoded to provide an index of impression polarity. A score of eight was given the most favorable category when positive stimuli were judged and the most unfavorable category when negative stimuli were judged.

Subjects. Subjects were 55 male and 41 female undergraduates at Ohio State University fulfilling an Introductory Psychology requirement for experimental participation. Subjects were arbitrarily assigned to conditions within the experiment, 16 to each of the six set sizes used. Four subjects had to be replaced as they failed to complete one or more responses requested in their booklets.

Results

Impression Polarity. The mean polarity of the four items in each booklet increased with increasing set size ($F = 8.32$; $df = 5,84$; $p < .001$). The linear and quadratic trends across set size were both significant ($F_{linear} = 30.12$; $df = 1,84$, $p < .001$; 72% of variance accounted for; $F_{quadratic} = 9.09$; $df = 1,84$, $p < .003$; 23% of variance accounted for). Also, the set size effect held for positive sets ($F_{linear} = 15.60$; $df = 1,84$; $p < .001$) and negative sets ($F_{linear} = 25.19$; $df = 1,84$, $p < .001$) separately. There was no interaction between item valence and set size ($F < 1$, n.s.).

As previous research (Anderson, 1967; Manis, Gleason and Dawes, 1966) has found that set size and evaluative polarity judgments are related by a negatively accelerating function, one form of such a function was

Stimulus Valence	Set Size					
	1	2	3	4	5	6
Favorable	5.62	5.25	5.59	6.50	6.34	6.65
Unfavorable	4.72	5.81	5.66	5.94	6.44	6.47
$\bar{X}$	5.17	5.53	5.63	6.22	6.39	6.56

TABLE 2: Impression polarity as a function of stimulus valence and set size

examined. When set size is transformed to log (base 2), the linear trend was significant ($F = 39.90$; $df = 1,84$; $p < .001$) and accounted for 96% of the between-subjects variance. The residual was not significant ($F < 1$; $df = 4,84$).

Thus a between-subjects set size effect of the expected form is obtainable when a maximally sensitive design is employed. The discovery of such a strong between-subjects effect convincingly eliminates subject awareness as a prerequisite for the evocation of the set size effect. At the same time it is supportive of both the averaging and reference scale interpretation.

The reference scale prediction of convergence of polarity ratings recieved some support here, even over the space of only four trials. In testing the convergence from the first two sets to the second two sets, neither the overall interaction ($F < 1$; $df = 5,84$; n.s.) nor the linear trend ($F = 1.10$; $df = 1,84$; n.s.) was significant.

A more sensitive way of testing this convergence is to examine the change in extremity ratings from the first judgment to the third. The first item is the one most likely to produce a set size effect according

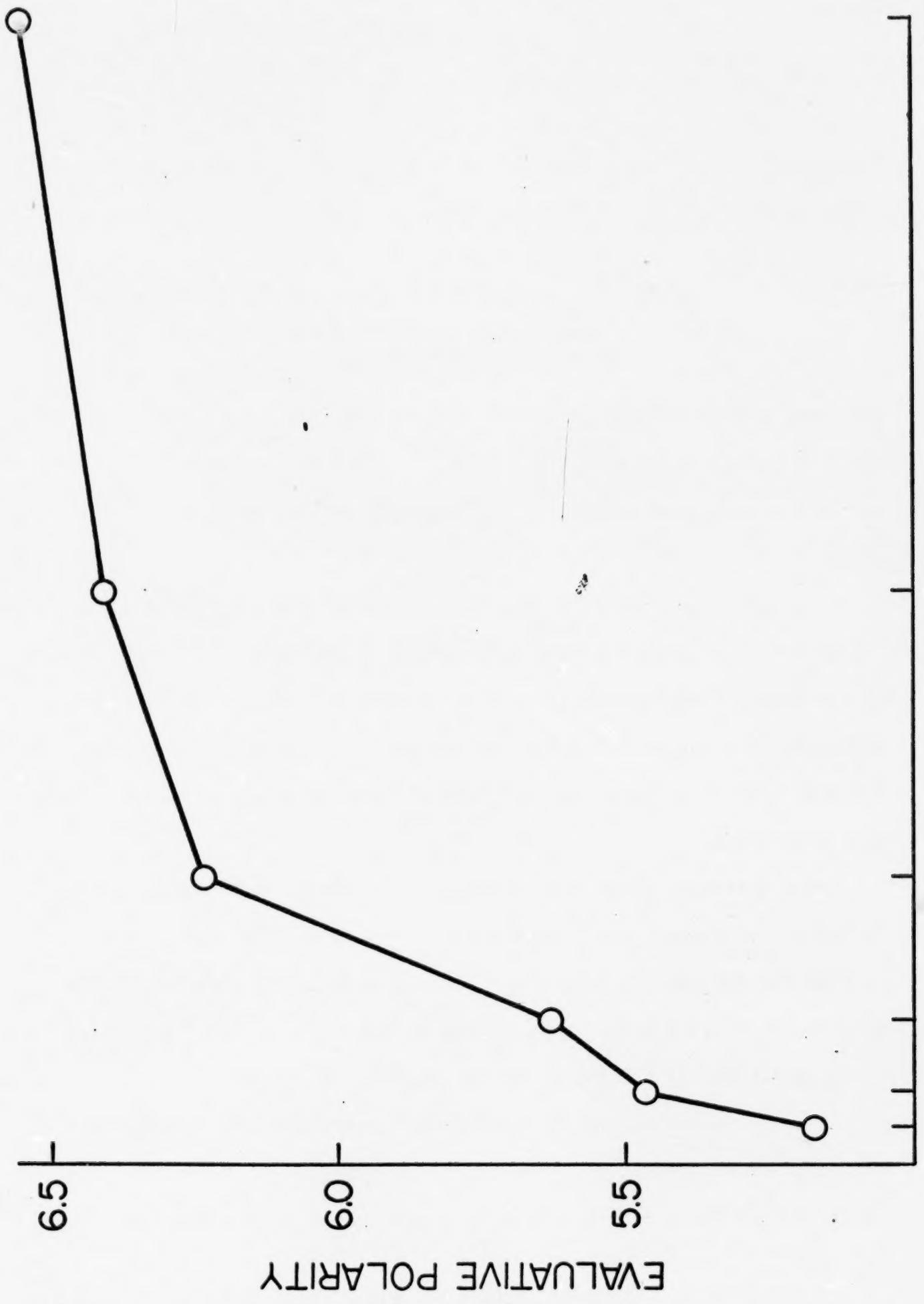

FIGURE 1: Evaluative polarity as a function of set size: Experiment 1.

to reference scale interpretations and the third is the next stimulus set of the same valence. By the third trial, the ends of the ideosyncratically anchored reference scale should begin adjusting to the range of stimuli, thus increasing the polarity of the smaller set sizes and decreasing that of the larger sets. In fact, the set size effect did diminish over trials when examining the linear component of this set size by trials interaction (F = 4.34; df = 1,90; p <.04). The polarity of the 32 size sets differed from that of the one size sets by 1.63 scale units for the first description, but differed by only 0.69 on the third trial. Since the primary analysis of the average prediction was not significant, this data can't be considered strongly supportive of the reference scale prediction. However, it appears inconsistent with the information integration model.

Confidence. Chalmers (1971), Levy (1965) and Posavac and Pasko (1971), employing within-subjects designs, have found that as set size increases, confidence in judgments of those sets also increases. If feelings of confidence mediate the set size effect in between-subjects designs, confidence judgments should be significantly effected in the present study. Confidence was not found to significantly increase with set size when looking at the overall main effect (F = 1.41; df = 5,84; n.s.) or just the linear trend (F = 2.38; df = 1,84; n.s.). The mean ratings did, however, tend to increase along with set size. In order of increasing set size, the means were 5.34, 5.14, 5.91, 5.98, 5.83, and 5.97.

Discussion

The finding of a between-subjects set size effect is compatable with both the averaging information integration model and the reference scale interpretation of set size effects. However, the suggestion of a diminished

set size in later trials supports only the reference scale interpretation and stands in contrast to the averaging model prediction of increased reliability of the set size effect in the later trials. Because the support provided that prediction in this study was not conclusive, a second experiment was conducted to more effectively test the convergence hypothesis by greatly increasing the number of judgments made by each subject of sets of a single size.

Experiment 2

Method

Overall Design. Experiment 2 provided a between-subjects test of the set size effect by presenting each subject with 28 isovalent stimulus sets, 14 containing favorable and 14 containing unfavorable traits. Two levels of set size, two and eight, were used. For each stimulus set, subjects judged impression favorability and confidence.

Stimuli. Stimulus adjectives again were selected from Anderson's (1968) list. Thirty-two positive traits ranged from 3.74 to 3.45 and 32 negative from 2.54 to 2.22. Within the positive and negative pools of 32 traits, the adjectives were rank ordered and divided into eight groups of four traits.

The 28 description sets of eight traits were chosen in a manner similar to Experiment One by randomly selecting one word from each of the eight groups above. Two-size sets were created by randomly selecting one group from the four highest value groups and its complement from the 4 lowest value groups (i.e. 1 and 8, 3 and 6, etc.). One word was randomly chosen from each of these two groups to form a two size set. The average value of the positive sets of size two and eight were both 3.599. For negative sets, the average value of two and eight size sets were both 2.353.

Experimental Booklets. Each booklet contained 28 description sets of

the same size; 14 persons were described by moderately negative traits and 14 by moderately positive traits. Position of each particular description within the series of 28 was systematically varied by Latin square counterbalancing. A sequence of two 14 by 14 Latin squares were employed in balancing presentation order. Each was composed of half of the positive and half of the negative sets of a given size. The order of presentation of the two Latin square row sequences was also balanced, thus producing 28 different orders of presentation; a unique order for each subject. Half of the booklets began with a positive set and half began with a negative set.

The stimulus sets were in one booklet and the response forms were in another. Response measures were the same as in Experiment 1.

Procedure. Experiment 2 was the same as that for Experiment 1 except that subjects remained together at a large table while completing the experimental booklet.

Subjects. Nineteen male and forty-nine female undergraduates at Ohio State University serving as subjects were ramdomly assigned to one of the two set size conditions in the experiment. Subjects had some difficulty in completing the task correctly both because of its length and the separation of the stimulus and the rating sheets into two booklets. Consequently, 12 subjects had to be replaced; seven from the eight adjective set size condition and five from the two set size condition. Fifty-six subjects filled the requirements of the design.

Results

Impression Polarity. There was an overall set size effect on person evaluations; persons described by eight traits were judged more extremely than those described by only two adjectives ($F = 11.43$; $df = 1,54$; $p < .001$).

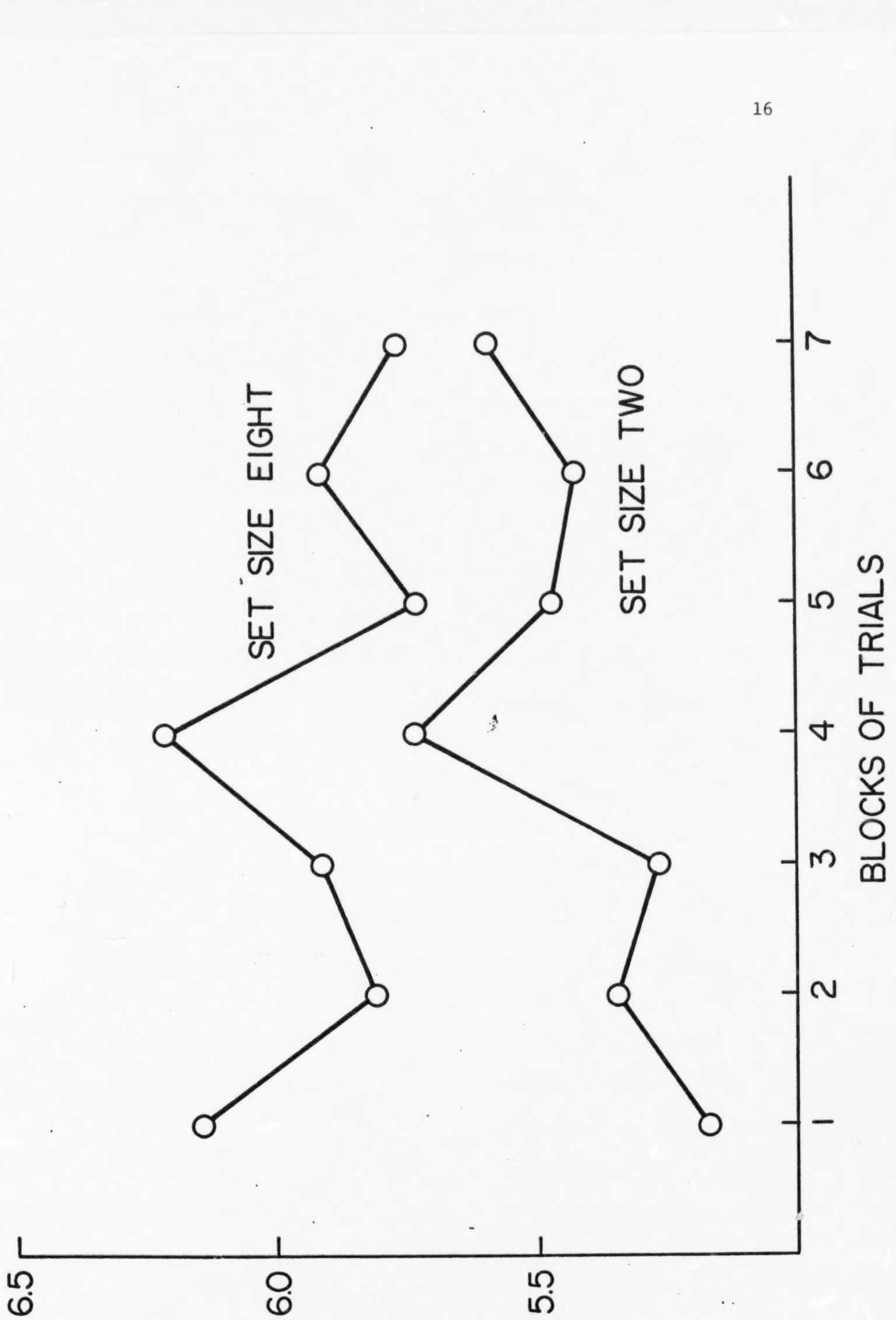

FIGURE 2: Evaluative polarity as a function of trials and set size; Experiment 2.

The set size effect held for both positive and negative stimulus sets; the set size by valence interaction was nonsignificant ($F < 1$).

The set size effect became less pronounced over trials. As predicted by the reference scale interpretation and suggested by the data of Experiment 1, judgments initially polarized by the set size effect converge over trials producing a set size by trials linear interaction ($F = 5.45$; $df = 1,54$; $p < .05$). This interaction was of similar form for both positive and negative stimuli ($F < 1$, n.s.).

The information integration approach suggests that the set size effect should be strongest with the later stimuli in the series. Yet, while the set size effect was strong for the first 14 stimulus sets ($F = 17.18$; $df = 1,54$; $p < .001$), the difference in evaluative polarity for the last 14 sets did not reach significance ($F = 3.86$; $df = 1,54$; $p < .06$) between the two set sizes.

Confidence. There was virtually no difference in confidence ratings given the two set sizes ($F < 1$; $df = 1,54$). The mean ratings for the two and eight size sets were 4.49 and 4.44, respectively. The suggestive trend observed in the first study was not supported by this data.

Although confidence was not affected by set size in these two experiments, it usually is affected in within subjects designs (Chalmers, 1971; Levy, 1965; Posavac and Pasko, 1971). Thus it may be that salience of set size differences is a prerequisite for obtaining set size effects on confidence ratings. If so, the presence of confidence differences in a within subjects design may serve to increase the effects of set size in evaluative polarity judgments.

Discussion

The discovery of a between subjects set size effect allays the hypothesis that mere salience of varying amounts of information is responsible for the set size effect. Although salience is not a necessary condition for producing a set size effect, it may well contribute to the phenomenon in within-subjects designs.

These possible salience effects should not be confused with the statistical differences between the within-subjects and between-subjects designs. Naturally, the within-subjects design acts to reduce the within-subject's variance and thereby enhance the significance of the between-conditions variance (set size effect). A brief examination of the data reported in the investigations presented in Table 1 will reveal another difference. Typically, the between condition variance is much greater in within-subjects designs than in between-subjects formats, even when the range of set size is held constant. If this augmentation of mean difference is indeed due to the saliency of cue numerosity as suggested here and elsewhere (Grice, 1966; Rosenblook, 1970), then saliency becomes a very meaningful and research worthy phenomenon of social judgment processes.

The information integration model proposed by Anderson predicts no effects of repeated presentation other than those associated with increasing statistical reliability and enhanced stability of responding due to task familiarity. Both considerations predict an increase in the reliability of the set size effect as repetition of homogeneous sets progress, a prediction not supported by the present paper.

It is assumed by the information integration formulation that the scale value of the stimuli are invariant. Rather, it is the weights assigned to

the different stimulus sets that vary as set size varies. Therefore, if the information integration model is to account for the observed convergence over trials, it would have to be in terms of weight changes.

According to the information integration model, the response to a set of k stimuli is given by: $R = \frac{w_o s_o + w\ ks}{w_o + w\ k}$ where initial attitude, s_o, is assumed to be neutral, s is the scale value of the set, and $w = 1-w_o$. Under this model the set size effect, $R_{High} - R_{Low}$, changes as a curvilinear function of the weight of the initial opinion, w. The set size effect reduces to zero under the two extreme conditions of w_o equalling either zero or unity. In these two cases the point of convergence would be at s and at s_o, respectively. If, for example, it were assumed that the observed convergence were due to a decrease in the weight given s_o over trials, the information integration model would also predict an accompanying increase in the polarity of response given both the large and small set sizes over trials. Contrary to this expectation, no overall increase or decrease in response polarity was observed in Experiment 2 ($\underline{F} < 1$).

Convergence of homogeneous set size polarity ratings over trials was predicted by the reference scale interpretation. In terms of the reference scale interpretation, the judges' personal "ideosyncratically anchored" reference scale was replaced by a reference scale whose extremes were determined by the stimulus set size. As that ideosyncratic anchorage was replaced, the set size effect dissipated. This account of the observed convergence effect assumes that large sets have more extreme scale value than small sets and that the underlying judgment scale changed over trials. This explanation of the convergence effect differs in an important way from the information integration model. By not assuming invariance of scale values, it is more

compatible with the meaning shift interpretation of the set size effect.

According to the meaning shift model, the scale values of the items within a given set of items shift as alternative meanings of each item are excluded by the context. The greater the number of homogeneous stimuli, the more complete the exculsion of incompatible alternative meanings, especially contrapolar ones, thus creating a resultant evaluation of greater polarity.

If indeed scale values are shifted by the processes described above, it is interesting to speculate about the ideosyncratically anchored scale of the average subject. Presumably, the stimulus set sizes which most nearly approximated the subjects' internal scale would change polarity least over trials. In the first experiment, one sized sets polarized .45 scale units over four trials while 32-sized sets depolarized by .49. All set sizes shifted somewhat over trials in Experiment 1 but the set sizes which produced the least change were 4 and 8. In Experiment 2, greatest change occurred for a set size 2 ($\underline{F}$ = 3.83; $\underline{df}$ = 1,54; $\underline{p}$ <.06) in the convergence interaction, increasing polarity .49 scale units. Set size 8 responses remained more nearly stable; decreasing in polarity only .36 units ($\underline{F}$ = 1.80; $\underline{df}$ = 1,54; n.s.). In both experiments the best estimate of the average ideosyncratic scale seems to be approximately equivalent to that established by slightly fewer than 8 items of information.

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MESSAGE REPETITION AND ATTITUDE CHANGE

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Most persuasion research employs only a single message presentation. This paradigm, however, differs from the manner in which people are typically exposed to persuasive communications. In this era of mass media, identical or highly similar messages are often repeatedly exposed to the same audience. Advertisers have long advocated repeated exposure of the same ad and attempted to develop measures to investigate the efficacy of this approach (Krugman, 1968). Interestingly enough, laboratory research investigating the effect of differing frequencies of message presentation has failed to uncover immediate post treatment effects on attitude.

Goldberg (1954) asked subjects to judge from photographs the intelligence of nine males. Before viewing each picture, subjects were provided discrepant ratings supposedly given the stimulus picture by members of the subject's group. Slides and the accompanying discrepant ratings were repeated from 5 to 20 times with the subject asked to give an evaluation after each presentation. Increasing the number of exposures to the supposed group norm did not produce additional conformity. Goldberg suggested that subjects might perceive the group norm as an added datum upon which to base an initial evaluation of the stimulus, but that reexposure to this datum did not result in further revision of the person's opinion.

Several other investigators (Johnson and Watkins, 1971; Wilson and Miller, 1968) investigated the effect of number of repetitions of a persuasive message upon both immediate and delayed attitude change. Frequency of presentation was not found to affect attitudes expressed immediately following the message. Attempting to explain the absence of an immediate repetition effect Johnson and Watkins (1971), like Goldberg (1954), hypothesized that with initial perusal of a non-complex message a subject will modify his position, but that repetition of the communication will not lead to additional significant attitude change.

An important similarity among the preceding studies is that all repeated identical communications and thus subjects could not be expected to anticipate new information or arguments as a function of repetition. Sears & Freedman (1965) examined the effect of expected argument familiarity upon opinion change. Experimental subjects read a trial report and indicated their decision as to guilt. A second persuasive communication was then distributed. Subjects were told that this communication contained either new information or a rediscussion of arguments already raised. It was found that prefacing a communication with the statement that it contained new information lead to significantly greater amounts of change. Sears and Freedman hypothesized that the expectation of new information constituted satisfactory justification for relinquishing a previous commitment and moving toward the advocated position. Such a reevaluation, however, would not be as justified when the same old arguments were anticipated.

A further asset of a message appearing to contain new information is that people will attend more closely to it. For example, Brock,

Albert, and Becker (1970) have shown that subjects selectively attend to an unfamiliar message advocating a known stand a much higher percent of the time than they do to a familiar message, even when holding such factors as message utility and supportiveness constant.

The characteristics of the stimuli used may thus be critical in determining whether or not repetition enhances immediate attitude change. In a situation in which similar, but different-appearing, messages that advocate the same position are sequentially presented, attitude change should be a positive function of the number of presentations. The basis for such a prediction is that with the advent of each message, subjects would both attend more closely to the arguments and feel justified in reevaluating their position.

One study has examined the effects of repeated communications on attitude change by using non identical communications (Horowitz, 1969). Although attitude change was greater for the multiple than the single exposure condition in three of four experimental comparisons, the overall effect was not significant.

Two possible reasons exist for the effect not reaching significance in this study. In the multiple exposure condition, the messages were spread out over 3-5 days, thereby allowing substantial forgetting to take place. Secondly, the communications were somewhat unusual in that they were designed to arouse differential amounts of fear. Even in the low fear condition, the messages attempted to "forcefully and convincingly convey the dangers of drug abuse" (p. 35). It is possible that in both low and high fear conditions the messages aroused anxiety in subjects, thus interfering with or submerging the expected repetition effect.

In an experiment utilizing non-fear producing stimuli, it was expected that sequential exposure of similar messages on the same issue would result in greater acceptance of the advocated view with increasing repetition. A positive monotonic relationship was thus predicted between number of repetitions and favorable reactions to the advocated view.

Method

Overview

The experimenter told subjects that they were being given the chance to provide feedback to advertisers by expressing any thoughts, feelings, opinions or comments they might have about a particular message. Two groups of subjects were shown five commercially prepared ads for either Yardley After Shave or the U.S.O. Advertisements within each of the two groups had been selected on the basis of their similarity in argument topics. The order of presentation of messages was counterbalanced within each group. As each ad was being presented, subjects wrote any reactions they had to that particular communication on a standard form. The attitude dependent measure was derived from a cognitive response analysis of these reactions.

Subjects

Subjects were 57 introductory psychology students from Ohio State University who volunteered to participate in partial fulfillment of their research requirement. Data from seven students were discarded before analysis due to their failure to correctly follow directions. All analyses were thus based on 50 subjects, 25 for each of the two

groups of messages used. Subjects were in groups of from one to five while viewing the ads.

Communications

The persuasive communications were ten magazine advertisements published between 1960 and 1965. Half of the ads argued for the purchase of Yardley After Shave while the other five solicited contributions for the U.S.O. These particular advertisements were chosen because within each unit the same general arguments were advanced to support the advocated position. Thus the five Yardley ads each mentioned four general points: Yardley isn't a typical after shave, the product contains agents to prevent infections, Yardley contains agents to replace skin moisture, and the fragrance is pleasant. Advertisements not used stressed such aspects as the distinguished nature of the product, that it was purchased by men who wouldn't settle for the average, etc. Five U.S.O. ads were also found which were characterized by four common themes: The loneliness felt by young men away from home, tough working conditions of military personnel, large number of Americans in this situation, and the obligation of civilians to help military personnel.

The several arguments, while present in all advertisements, were phrased in different ways and sometimes appeared in different orders. Each of the ten messages was also dominated by a photograph or design related to the attitude object, and no two ads shared the same picture.

Procedure

Subjects were told that the purpose of this study was to allow people to reply to advertisers. They were informed that they would see five ads, each of which had been broken into four parts. Subjects

were instructed to write each of their thoughts or comments to an ad on a separate line in the response booklet. Preceding every second line in this booklet the word "thought" had been printed. A new response booklet was provided for each ad and the booklet was headed by a short block of instructions. It repeated the experimenter's initial directions and stressed that proper grammar and punctuation were not important.

Two groups of 25 subjects saw either the Yardley or U.S.O. messages. For each advertisement subjects first briefly viewed an overall picture of the message and then the first portion of the ad alone. The first section was projected for 45 seconds and during this period subjects recorded their thoughts, feelings, opinions, or comments in the response booklets. At the end of the 45 second period subjects were told that they could continue writing until finished. The last three parts of the ad were then presented in the same manner. After the first message had been completely shown, the experimenter told subjects that each advertisement was to be considered separately and that in subsequent messages, they were not to refer to previous communications. The four remaining Yardley or U.S.O. messages were then presented.

Presentation of Stimuli

Five slides were made of each advertisement. The introductory slide showed the complete message and picture. The remaining four slides allowed the experimenter to incrementally expose a particular ad. The first of these slides showed the photo dominating the ad and a segment of the written message, the rest of the communication being blacked out. The second slide again showed the ad portion from the first slide and in addition a second segment of the message body. The

beginning of the new message segment was indicated to subjects by a small triangular image on the side. This presentation procedure continued until the whole advertisement was exposed. The four segments into which each ad was broken were planned to basically correspond to the four general themes.

Five different sequences of the five ads were prepared according to latin square counterbalancing. Five subjects viewed each sequence.

Dependent Variable

The dependent variable was the net cognitive response score from each subject for a particular message. Procedurally the score represents an extension of the counterargumentation measures used in persuasion research (e.g. Brock, 1967). A theoretical basis for such a measure was advanced by Greenwald in 1968.

To obtain this score, a rater first determined the number of favorable, unfavorable and neutral responses listed by a subject in reaction to an ad. An individual argument was defined for scoring purposes as expressing only a single thought, fact, value, good or bad feature, feeling or belief about either the position advanced by the advertisement or the ad itself. After classifying the arguments as to favorability, the net cognitive response score was then obtained by subtracting the number of negative from the number of positive responses. Neutral responses are excluded in this scoring procedure.

The scoring technique was found to be reliable. Four days after scoring both the Yardley and U.S.O. advertisements, the rater rescored ten randomly selected subject comment sheets from each of the two ad units. The test-retest correlation coefficient was .967 for the U.S.O.

group and .988 for the Yardley set. Ten other subject comment sheets were randomly selected from each of the two groups and given to a second rater. The obtained inter-rater correlations were .825 for the U.S.O. messages and .900 for the Yardley group.

Results

Net cognitive response scores were subjected to a three way analysis of variance containing the within subjects effect of repetition (number of similar ads presented to a subject) and the between subject factors of message type (either the Yardley or U.S.O. ad units) and counterbalanced order (within each group of messages, ads were presented in five orders). If attitudinal responses do become more positive with repetition, a significant positive trend should be observed. A trend analysis of the repetition factor revealed a significant linear component ($F = 4.55$; $df = 1, 160$; $p < .05$). None of the other components approached significance. Reference to Table one indicates that, as predicted, the overall mean cognitive response score was positively related to the number of previously viewed ads.

Topic	Repetition				
	1	2	3	4	6
Yardley	-3.12	-2.44	-1.24	-.84	-1.88
U.S.O.	-.64	.24	.28	.92	1.40
$\bar{X}$	-1.88	-1.10	-.48	.04	-.24

TABLE 1: Attitude as a function of repetition and message topic

U.S.O. messages did tend to be more favorably evaluated than Yardley communications but such differences were only marginally significant (F = 3.47; df = 1, 40; p <.10).

Table one lists mean cognitive response scores for the Yardley and U.S.O. groups separately. In both groups a more positive evaluation with repetition is evident, with no indication of an interaction appearing between the two (F = .19; df = 4, 16; p = n.s.). In the case of Yardley messages, however, a decrease in evaluation did occur on the fifth presentation. Although such a decrease suggests the possibility of an asymptote in the repetition effect, a similar pattern was not found for the U.S.O. set of communications.

The data of Table one also help rule out a simple adaptation explanation of the repetition effect. Since both ads lead to predominantly negative responses on first exposure, one could argue that the obtained positive trend was due to subjects adapting to the stimulation and becoming more neutral. Such an interpretation, however, is not supported by the finding that after the first presentation of a U.S.O. ad, attitudes increased in the positive direction away from neutrality.

A second possible explanation is that more positive evaluations with repetition were simply due to subjects' attenuation of negative response. In the experimental situation, subjects might have become uncomfortable in repeatedly listing their negative thoughts and so tended to reduce the number of them over time. If this had occurred positive cognitive responses when studied separately, should remain approximately the same across repetitions and negative responses would decrease.

To examine this possibility, positive and negative cognitive

responses were tallied separately and the tallies were averaged over both topics. Table 2 shows that positive responses tended to increase with

Response	Repetition				
	1	2	3	4	5
Positive	2.76	3.24	3.22	3.58	3.70
Negative	4.64	4.34	3.70	3.54	3.94
Total	7.40	7.58	6.92	7.12	7.64

TABLE 2: Frequency of positive and negative responses as a function of repetition

repetition while negative responses decreased. The decrease in evaluation on the fifth presentation stemmed, in fact, from an increase in negative response. On the whole, the total number of positive and negative responses remained fairly constant over repetitions.

Discussion

The finding that more frequent exposure led to increasing acceptance of the persuasive message would initially appear at variance with the results reported by Goldberg (1954), Johnson and Watkins (1971), and Wilson and Miller (1968). The reason for such a discrepancy seems most readily attributable to differences in the nature of the stimuli used. These earlier studies repeatedly presented identical, easily understood stimuli. Apparently a subject in such experimental situations quickly modified his position to account for new information, but did not feel additional change necessary upon further presentations of identical data. In the present study similar, but not identical messages were employed. Each message featured a different picture and the arguments used, although similar, were phrased in slightly

different ways. One could hypothesize in the present study that with the presentation of each new message a subject felt warranted in reducing his previous commitment and adopting a position more congruent with that of the communicator. Such a finding supports in part the work of Sears & Freedman (1965), which indicated that persuasive communications were more effective when new arguments were expected. The tendency for message acceptance in one group of communications to decrease somewhat on the fifth repetition does, however, suggest the possibility of an asymptote in the repetition effect.

The dependent variable, cognitive response, did of course differ from attitude measures used in much previous work. Cullen (1968), however, provided evidence that a cognitive response type of measure significantly correlates with other traditional attitude indicators across a variety of attitude issues. Further, a cognitive response procedure would seem to provide more information on a subject's response to a message, in that it does not restrict itself to a limited set of attitude items.

Integrating the findings of this study with previous work on the effect of repetition would suggest the following points. Other investigators (Johnson & Watkins, 1971 ; Wilson and Miller, 1968) have shown that repeated presentation of identical stimuli does not effect immediate post-treatment attitude, but does seem to retard decay of the new attitudinal position. When similar rather than identical stimuli are employed, repetition does result in an increasingly positive evaluation immediately following presentation. As the present study sequentially presented the ads with a minimum interadvertisement time interval, it is impossible to conclude that longer intervals, such as one day or one week, would produce the same

linear trend. Also, the extent to which the repetition of similar stimuli confers resistance to decay and the possible presence of an asymptote in the repetition effect pose questions for further research.

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